

AMENDMENTS TO THE CLAIMS

Please amend claims 1, 4, 6, 10 and 11, cancel claims 16 and 17 and add new claims 21 and 22, as set forth in the following listing of claims, which will replace all prior versions, and listings, of claims in the present application.

Listing of Claims

1. (Currently Amended) A method of labeling a sample, comprising:
 conveying the sample through a channel having a first virtual wall fluid interface port,
the first virtual wall fluid interface port comprising a first opening formed in a side wall of the
channel, the first opening sized and dimensioned such that a fluid within the channel forms a
virtual wall in the first opening to define the first virtual wall fluid interface port;
 separating the sample in the channel into a plurality of bands; and
 injecting a labeling solution through the first virtual wall fluid interface port, wherein the
labeling solution interacts with one of said bands to form a labeled band.
2. (Original) The method of claim 1, further comprising the step of detecting the labeled band.
3. (Original) The method of claim 1, further comprising the step of ejecting at least a portion of
the labeled band from the channel.
4. (Currently Amended) The method of claim 3, wherein the step of ejecting a portion of
the labeled band comprises ejecting at least a portion of the labeled band through a second
virtual wall interface port in the form of one or more droplets, the second virtual wall fluid
interface port comprising a second opening formed in a side wall of the channel, the second
opening sized and dimensioned such that a fluid within the channel forms a virtual wall in the
second opening to define the second virtual wall fluid interface port.
5. (Original) The method of claim 1, wherein the labeling solution comprises a labeled species
and a binding molecule for binding to a selected band and the labeled species.
6. (Currently Amended) The method of claim 5, wherein the step of injecting the labeling
solution comprises injecting the labeled species through the first virtual wall fluid interface port
and injecting the binding molecule through a second virtual wall fluid interface port, the second

virtual wall fluid interface port comprising a second opening formed in a side wall of the channel, the second opening sized and dimensioned such that a fluid within the channel forms a virtual wall in the second opening to define the second virtual wall fluid interface port.

7. (Original) The method of claim 1, wherein the virtual wall fluid interface port has a diameter between about 25 μm and about 100 μm , such that when a fluid is disposed in the interior of the channel, the fluid forms a virtual wall at the virtual wall fluid interface port.

8. (Original) The method of claim 1, further comprising the step of separating the plurality of bands in to a plurality of sub-bands.

9. (Original) The method of claim 1, further comprising the step of transferring a labeled band to one of a MALDI-MS system and a multi-well plate for further analysis.

10. (Currently Amended) A method of labeling a sample, comprising:

conveying the sample through a channel having a virtual wall fluid interface port, the virtual wall fluid interface port comprising an opening formed in a side wall of the channel, the opening sized and dimensioned such that a fluid within the channel forms a virtual wall in the opening to define the virtual wall fluid interface port; and

injecting a labeling solution through the virtual wall fluid interface port, wherein the labeling solution interacts with the sample to label the sample.

11. (Withdrawn) The method of claim 10, further comprising the step of separating the sample into a plurality of bands.

12. (Withdrawn) A system for performing a labeling operation, comprising:

a column for conveying a sample mixture through the system, wherein the column comprises an interior bounded by a side wall;

a separation region for separating the sample mixture into a plurality of bands;

a first fluid interface port downstream of the separation region for injecting labeling molecules into the interior of the column.

13. (Withdrawn) The system of claim 12, further comprising a detector downstream of the first fluid interface port for identifying bands of the sample mixture in the column.

14. (Withdrawn) The system of claim 12, further comprising a second fluid interface port downstream of the first fluid interface port for injecting a binding molecule into the column.

15. (Withdrawn) The system of claim 12, further comprising an ejector for ejecting a band of the sample mixture from the column.

16. (Canceled)

17. (Canceled)

18. (Withdrawn) The system of claim 12, further comprising a second fluid interface port formed in the side wall of the column upstream of the separation region for injecting the sample mixture into the column.

19. (Withdrawn) The system of claim 12, wherein the fluid interface port has a diameter between about 25 μm and about 100 μm , such that when a fluid is disposed in the interior of the microchannel, the fluid forms a virtual wall at the fluid interface port.

20. (Withdrawn) The system of claim 12, further comprising:
a second fluid interface port upstream of the separation region for injecting the sample mixture into the column;
a third fluid interface port downstream of the second fluid interface port for injecting a binding molecule into the column, whereby the binding molecule and the labeled molecules interact with a selected band to form a labeled band;
a detector downstream of the third fluid interface port for identifying the labeled band;
and
an ejector for ejecting the labeled band from the column.

21. (NEW) The method of claim 4, wherein the step of ejecting employs a pressure pulse generator, said pressure pulse generator comprising a conical-shaped pressure chamber disposed opposite the second virtual wall fluid interface port and in communication with the interior of the channel and a piezo-actuated membrane connected to the pressure chamber.

22. (NEW) The method of claim 4, wherein the step of ejecting employs a pin assembly comprising a first pin and a second pin spaced from the first pin to define a capillary for receiving a liquid volume.